

Work Order ID 68181



Page 1

Thursday, April 07, 2011 1:56:43 PM

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Fwd

Start Date: 4/7/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 4/27/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: *[Signature]*

Date: 11-04-11

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D407-667-145

Rev C

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D407-667-105 CHG003

Subtotal

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

SAD 11-05-26

①

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D407-667-145 using CNC bender program 407-fw

SAD 11-05-26

①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

S 11/05/12

(40)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Customer:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

140

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- scribe batch # inside of cuff

2-Drill pilot holes in tube using drill Jig DT8541 & DT8542 as per Dwg D407-667-145. Drill all (3) top holes use drill table jig DT8577 hole #1,#11 to set up towers, as per QS10010.

3-Drill and Ream all holes in tube to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145 Check dimensions between holes on all four sides.

4-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

5-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg 407-667-145. Drill only the top (2) holes.

6-Drill & ream the top (2) holes to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145

7-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-145. Note: Fwd side has 3x top holes.

8-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D407-667-145.

9-C'sink holes as per Dwg D407-667-145. Allow rivet to sit below surface to compensate for paint.

10 -Deburr & Inspect for surface damage. Repair damage within limits as per

TW
SAD
11-05-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Cust Item ID:

Required Date: 4/27/2011 Req'd Qty: 1.00



Customer:

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Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
	Dwg D407-667-145								
150 HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion Memo	0.00 0.00		SAD 11-06-01					
160 QC Quality Control	QC3- Inspect Part Finish Memo	0.00 0.00		Sub6601					
170 QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00		Sub6601					

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo OUTSIDE SERVICE -CROSSTUBES Liquid Penetrant Inspection as per QSI 038 Or Issue P/O: 14223 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00 0.00							CL 11/06/01 ①
190 Packaging Packaging	Packaging Memo Inspect for transit damage Ensure copy of NDT results attached to work order.	0.00 0.00							PC 11/16/01 ①
200 QC Quality Control	QC5- Inspect part completeness to step on W/O Memo Inspect for damage & ensure results are as per Dwg D206-667-145	0.00 0.00							BT 11 06 01

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 4/27/2011 Req'd Qty: 1.00

Customer:



Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
 SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: 900								
	Finish Time: 1000								
	PAINT:								
	Start Time: 200								
	Finish Time: 300								
220	QC14- Inspect Spray Paint	0.00							
 QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

85 11-06-01

AD 11-06-02

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

230

0.00



Crosstubes

Crosstubes

Memo

0.00

1-Install support using 0.03" to 0.06" thick layer of magnobond 6398 per QSI 015. Let cure for 12h after installation and prior to packaging. Note: (3) top holes should be facing up.
A/R Magnobond 6398 : 116 677

2-Torque clamps to 80-100 in lb

3-Install nut plates as per Dwg D407-667-145. Touch-up rivet heads with Imron paint.

RT 11-06-02

240

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8 u106103

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250 	Pick Kit	0.00							
Packaging Memo		0.00				11/6/358			
Packaging									
260 	QC4- 100% Inspect kits for completeness	0.00							
QC Memo		0.00		8 w/6666		40			
Quality Control									
270 	Packaging	0.00							
Packaging Memo		0.00							
Packaging	Identify and pack for shipping as per PPP D407-667-105								
	Location: _____								
	PPP Rev: _____								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Cust Item ID:

Required Date: 4/27/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

11/6/30

MK

11-06-07

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

Thursday, April 07, 2011 1:56:49 PM

Page 1

Work Order ID: 68181

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd



Start Date: 4/7/2011

Required Date: 4/27/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:F 05.09.01 Add holes for compatibility with Bell Skidtubes KJ/JLM
 IPP Rev:G 08-05-16 chg QC6 to QC15 DD verified by:EC
 IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC
 IPP Rev:J 08-07-28 update as per (par 08-013) DD verified by:EC
 IPP Rev K 09.01.06 ECN 08-562 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-105TRN 		Manufactured	No			110	Each	0.0000	1	1			
Crosstube Turning Detail													
D2873-043 		Manufactured	No			230	Each	24.0000	2	2			
Nut Plate Assembly													
<div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div>													
<div> <div>LG052</div> <div>24</div> <div></div> </div>													
<div> <div>65375</div> <div>4</div> <div></div> </div>													
<div> <div>66898</div> <div>20</div> <div></div> </div>													
D2873-045 		Manufactured	No			230	Each	19.0000	2	2			
Nut Plate Assembly													
<div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div>													
<div> <div>LG052</div> <div>19</div> <div></div> </div>													
<div> <div>65992</div> <div>19</div> <div></div> </div>													
D2891-1 		Manufactured	No			230	Each	26.0000	2	2			
2.25 Support													
<div> <div>Location</div> <div>Loc Qty</div> <div>Loc Code</div> </div>													
<div> <div>LG052</div> <div>26</div> <div></div> </div>													
<div> <div>53773</div> <div>20</div> <div></div> </div>													
<div> <div>62595</div> <div>6</div> <div></div> </div>													

B68065 => 1

68084

67741

~~68084~~

SAM 11-05-25

2T 11-06-03

2T 11-06-03

2T 11-06-02

x2

W/O:		WORK ORDER CHANGES					
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Work Order ID: 68181

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 4/7/2011

Required Date: 4/27/2011

Start Qty: 1.00

Required Qty: 1.00

D3595-063-395

Manufactured No

230 Each

69.0000 4 4



RUBBER CUSHION



25 11-06-02

Location

Loc Qty

Loc Code

LG055

69

63368

17

65361

52

X4

MS20601-AD4W10

Purchased No

230 Each

184.0000 14 14



RIVET



25 11-06-03

Location

Loc Qty

Loc Code

LG051

184

116186

3

116767

82

117193

99

X14

MS21920-20

Purchased No

230 Each

80.0000 4 4



Clamp (per MIL-DTL-8783C)



25 11-06-02

Location

Loc Qty

Loc Code

LG050

80

116799

30

117279

50

X4

AN5-10A

Purchased No

250 Each

320.0000 10 10



Bolt



11/6/35

Location

Loc Qty

Loc Code

ST337

320

116704

20

116924

50

117010

50

117313

200

10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Work Order ID: 68181

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 4/7/2011

Required Date: 4/27/2011

Start Qty: 1.00

Required Qty: 1.00

AN5-30A
BOLT

Purchased No

250 Each

61.0000

4

4

Location

Loc Qty

Loc Code

ST339

61

114941

11

116003

50

AN5-32A
Bolt

Purchased No

250 Each

153.0000

4

4

Location

Loc Qty

Loc Code

ST340

153

115108

43

115589

60

117161

50

AN960JD516 NAS1149D0563J
Washer

Purchased No

250 Each

0.0000

18

18

MS21042L5
Nut

Purchased No

250 Each

845.0000

4

4

Location

Loc Qty

Loc Code

ST300

845

115594

85

116105

500

116548

260

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

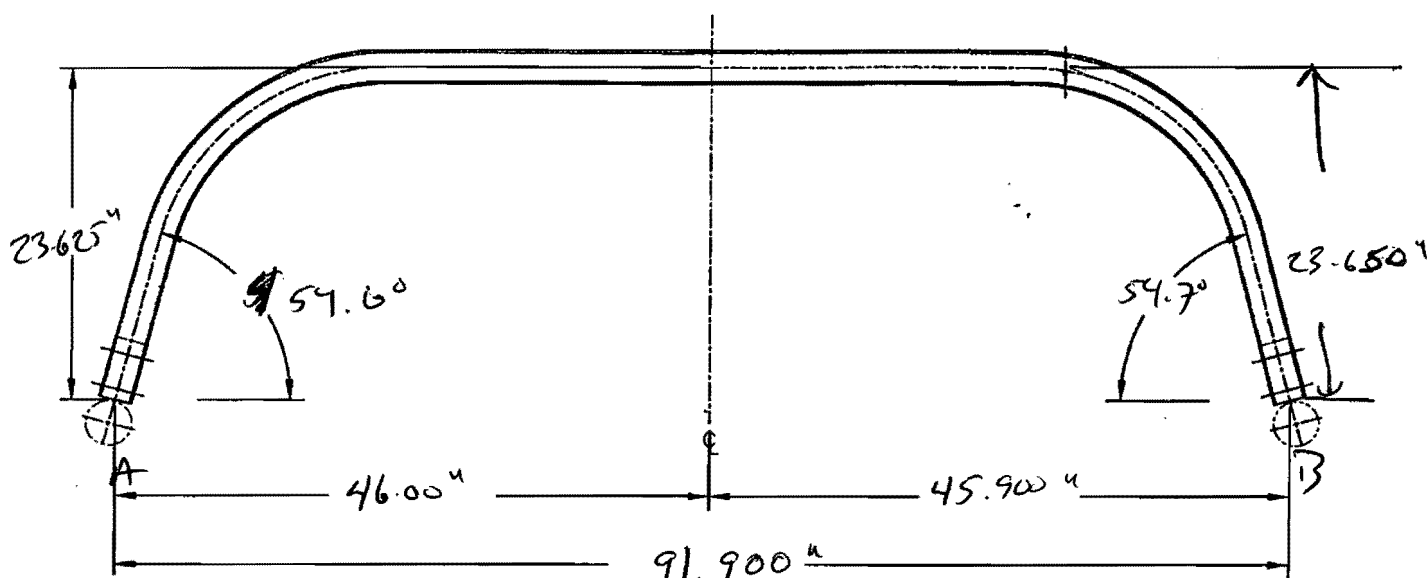
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DART AEROSPACE LTD		Work Order:	68181
Description: Crosstube High Fwd (407)		Part Number:	D407-667-105
Inspection Dwg: D407-667-145 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	23.41	23.67
1/2 Span	45.81	46.07
Angle	54	56
Total Span	91.63	92.13



Comments

QC15 Inspection	S
Date	11/15/26

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.11.12	Dimensions updated per Dwg Rev C	KJ	

W/O:		WORK ORDER CHANGES					
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Item	Qty -145	Part Number	Description
1	X	D407-667-145	CROSSTUBE ASSEMBLY (407 HIGH FWD)
2	1	D6010-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W 10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6010-115
FINISHED LENGTH = 113.20±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-145" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 17.8 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY,
TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE
TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER
QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE
THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS
ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 68181
RF 11-04-7

RELEASED
03/11/12

C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. 7 ADD TOLERANCES (ZN C6-3, C4-3, D2-3); RELOCATED FLAG #8 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	02.05.08
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. C
CHECKED	RF	D407-667-145	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	08.11.06		

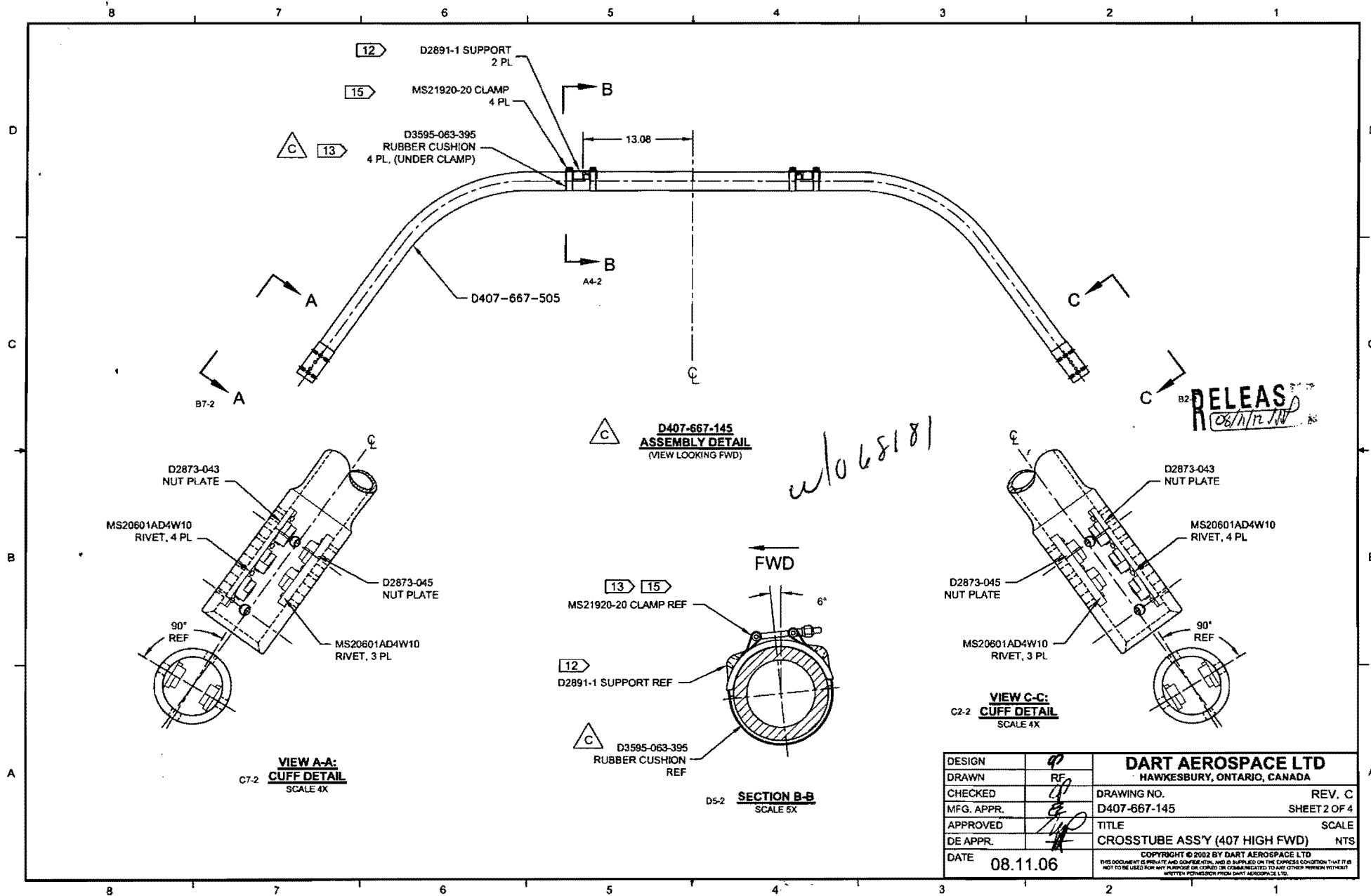
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



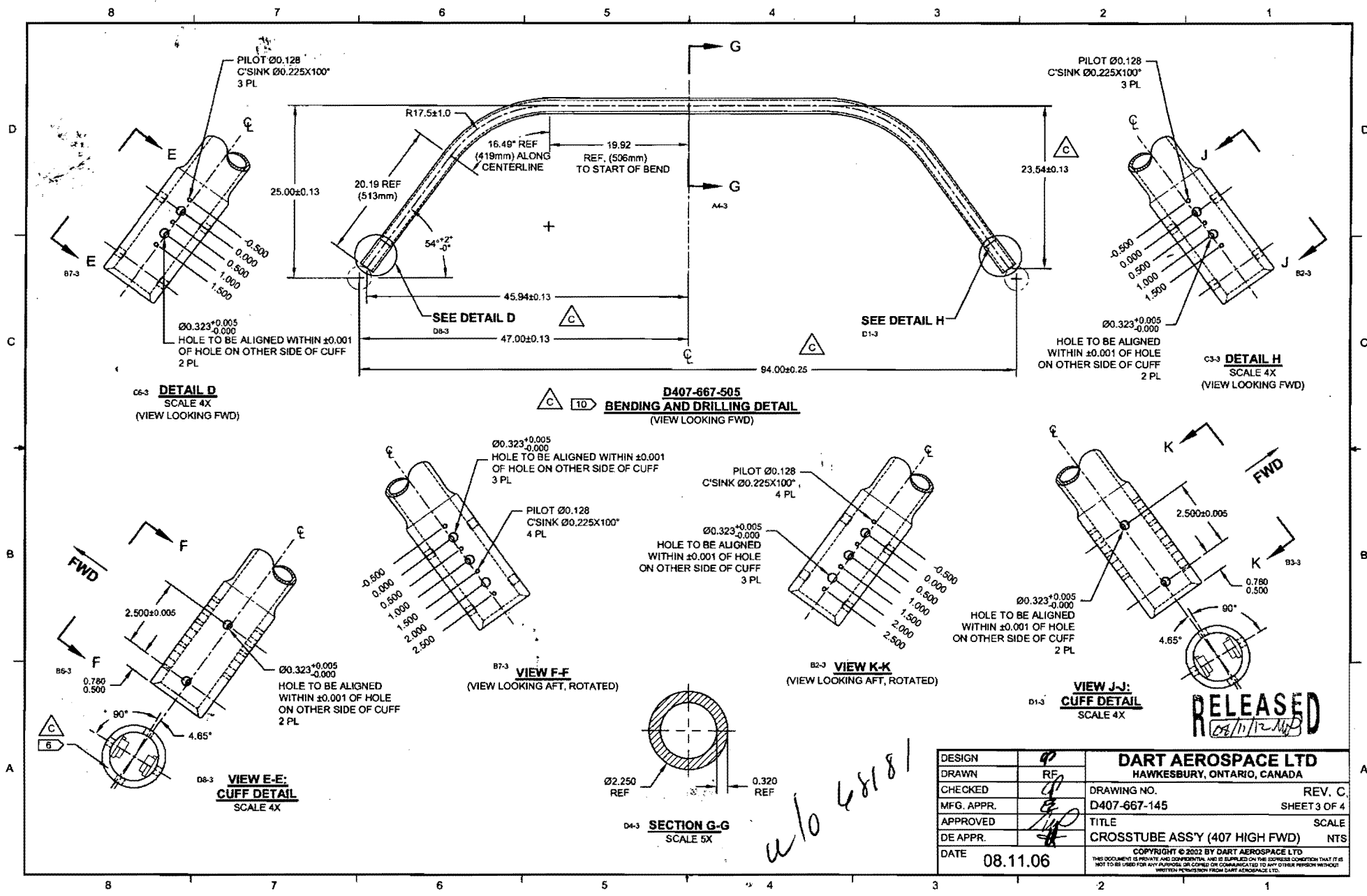
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial, all entries



DESIGN	4	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	4	DRAWING NO.	REV. C.
MFG. APPR.	4	D407-667-145	SHEET 3 OF 4
APPROVED	4	TITLE	SCALE
DE APPR.	4	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD	
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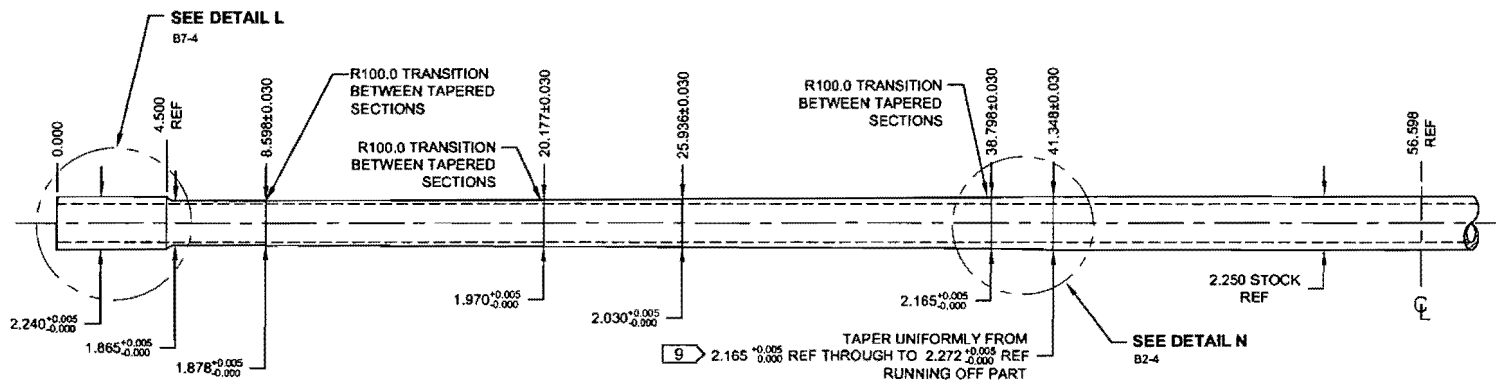
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

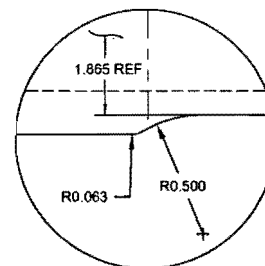
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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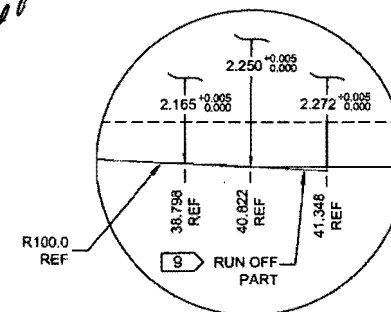
NOTE: Date & initial all entries



TURNING DETAIL



DETAIL M:
CUFF TRANSITION
NOT TO SCALE



DETAIL N:
TAPER RUN-OFF
NOT TO SCALE

RELEASED

DETAIL L:
CROSSTUBE CUFF
NOT TO SCALE

DESIGN	4	DART AEROSPACE LTD	
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CHECKED	4	DRAWING NO.	REV. C
MFG. APPR.	4	D407-667-145	SHEET 4 OF 4
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P-05612

PAGE 1 OF 1

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/NO.

WORK LOCATION

ACCEPTANCE STD.

TIME

AM

PM

DART AEROSPACE

CHARTACE / HAN / LYNN

1270, ABERDEEN RD
HAWKES BURY, ON

JUL 01 2011

188-11-022138

14223

AS ADDRESS

ASIN 1417/051038

REV./DATE

2005

WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 4 "CRUSTUBES"

SEE BELOW

JOB DESCRIPTION

PROCEDURE NO. LT-003 REV./DATE 2008

TECHNIQUE NO. LT-003

REV./DATE 2008

PART NO.

MATERIAL

THICKNESS

SCOPE

ALODINE ALUMINUM

N/A

PERFORMED A WET FLUORESCENT L.P. INSPECTION ON 100% OF THE EXTERNAL
SURFACE ON 4 CRUSTUBES

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N	13798	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
PENETRANT	ZL-67	MINIMUM DWELL TIME	10 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER	H ₂ O	MINIMUM DRY TIME	>10 MIN.	OTHER	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
DEVELOPER	SKD-32	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY	CAL DUE DATE	AUG 15 2011

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☐ IMPERIAL)

1	CRUSTUBE W.O.I.D. 68180	✓	ITEM ID	D407-667-105	FWD
2	W.O.I.D. 68181	✓	ITEM ID	D407-667-105	FWD
3	W.O.I.D. 69357	✓	ITEM ID	D412-664-203	AFT
4	W.O.I.D. 69359	✓	ITEM ID	D412-664-203	AFT

NO RELEVANT INDICATION WAS
DETECTED AS PER APPLICABLE STANDARD

ET 11-06-01

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

Dan G. Hiley

PRINT

[Signature]

SIGNATURE

J. VESDESROS, ETU

1st TECHNICIAN2nd TECHNICIAN

CGSB LEVEL

SNT LEVEL

CGSB LEVEL

SNT LEVEL

CGSB REG. NO.

3049

CGSB REG. NO.

DTR # E44669

REPORT

REVIEWED BY:

NAME

INITIALS

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PT Sept 2005

